REMARKS

Claims 35, 37, 43, 46, 47, 49-51, and 57 are currently pending.

Obviousness-Type Double Patenting Rejection

In the January 18, 2011 Final Office Action, the Examiner rejected claims 35, 37, 43, 46, 47, 49-51 and 57 on the ground of non-statutory obviousness-type double patenting as being unpatentable over claims 1-6 of U.S. Patent No. 7,662,392 B2 (the "'392 Patent"). The Examiner asserted that although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims are directed to a method of treating a disorder comprising administering stromal-derived factor-1. The Examiner also asserted that the pending claims and the claims of the '392 Patent recite administration of SDF-1 to the same subject population and to the same tissue. The Examiner stated that simply stating a new property of SDF-1 does not render the claimed method of the instant application unobvious over the claims of the '392 Patent.

Applicant's Response

In response, applicant respectfully traverses this rejection. Claim 1, the sole independent claim of the '392 Patent, discloses a method wherein SDF-1 is administered by injection into heart muscle. None of the dependent claims 2-6 teaches intramyocardially or intracoronally administering SDF-1. In contrast, applicant's claimed invention expressly recites intramyocardially or intracoronarily administering an agent comprising a human stromal derived factor-1.

Moreover, contrary to the Examiner's assertion on page 4 of January 18, 2011 Final Office Action, the pending claims do not "simply stating a new property of SDF-1". The Specification of the subject application discloses that:

> intramyocardial administration of SDF-1 causes improvement in cardiac function after acute ischemia through two separate mechanisms, a direct mechanism which involves induction of cardiomyocyte cycling and regeneration and an indirect mechanism operating through enhanced chemotaxis of mobilized bone marrow-derived endothelial progenitors and cardiac neovascularization. (Page 78, lines 21-27)

Accordingly, the subject application teaches that there are two distinct methods for administering SDF-1 to improve cardiac function.

The pending claims recite a method of treating a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes by "induce regeneration of endogenous cardiomyocytes". In contrast, the '392 Patent claims are directed to a method of "increasing trafficking of bone marrow-derived endothelial progenitor cells to ischemic myocardium". Applicant respectfully submits that the claimed method directed to "induce regeneration of endogenous cardiomyocytes" is not obvious over a method of "increasing trafficking of bone marrow-derived endothelial progenitor cells to ischemic myocardium".

Accordingly, applicant respectfully submits that the claimed method is not obvious over the claims 1-6 of the '392 Patent. Applicant requests that the Examiner reconsider and withdraw this ground of rejection.

Claims Rejected Under 35 U.S.C. §103

Claims 35, 37, 43, 46, and 57

In the January 18, 2011 Final Office Action, the Examiner rejected claims 35, 37, 43, 46, and 57 under 35 U.S.C. § 103(a) as being unpatentable over Petersen (U.S. Patent Application Publication No. 2002/0094327) in view of Hung et al. (U.S. Patent Application Publication No. 2003/0171294).

The Examiner asserted that Petersen teaches that a proposed alternative method for treating organ failure is organ regeneration wherein damaged cells of a failing organ are replaced with new, undamaged cells. The Examiner acknowledged that Petersen discloses a method for selectively directing migration of pluripotent stem cells to a target tissue within a subject by modulating the level of SDF-1α protein in the target tissue. However, the Examiner asserted that since Petersen teaches administration of SDF-1 to the same subject population and to the same tissue as recited in the pending claims, the regeneration of endogenous cardiomyocytes must have been inherently occurring in the prior art.

The Examiner asserted that Hung et al. teach "hibernating cardiac model is a particularly relevant model of coronary artery disease". The Examiner also asserted that the hibernating myocardium model is not representative of "healthy heart tissue". The Examiner further asserted that the disclosure of Hung et al. based on the hibernating myocardium model is relevant to the subject application since the pending claims which only recite "a disorder of a heart tissue". Finally, the Examiner asserted that although Petersen does not specifically disclose intramyocardial or intracoronary administration of SDF-1α, Hung et al. teach that it is routine to administer such factors via intramyocardial and intracoronary administration to the heart.

Applicant's Response

In response, applicant respectfully traverses this rejection. Applicant maintains that the combination of Petersen and Hung et al. does not render obvious the claimed method.

As an initial matter, applicant notes that the Examiner's assertion on page 8 of the January 18, 2011 Final Office Action that "the claims of the instant application only recite 'a disorder of a heart tissue'" is erroneous. Claim 35, from which the remaining claims depend, recites "[a] method of treating a subject suffering from a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes which comprises intramyocardially or intracoronarily administering to the subject an amount of an agent comprising a human stromal derived factor-1 effective to induce regeneration of endogenous cardiomyocytes and thereby treat the disorder of the heart tissue involving loss or apoptosis of cardiomyocytes in the subject, wherein the human stromal derived factor-1 is human stromal derived factor-1α or human stromal derived factor-1β." (Emphasis added) As discussed in more detail hereinbelow, not all disorders of a heart tissue involve loss or apoptosis of cardiomyocytes.

Petersen provides a laundry list of tissues to which SDF-1α could theoretically be administered in order to effect trafficking of "a pluripotent stem cell" to the tissue "from another site" in the subject.

Specifically, Petersen discloses that "[target] tissues can be any within the mammalian subject such as liver, kidney, heart, lungs, components of gastrointestinal tract, pancreas, gall bladder, urinary bladder, the central nervous system including the brain, skin, bones, etc." (Page 8, [0063]) Therefore, Petersen does not disclose treating "a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes", as recited in pending claim 35.

Moreover, Petersen discloses "a method for selectively directing migration of pluripotent stem cells to a target tissue within a

subject by modulating the level of SDF-1 alpha protein in the target tissue". (Page 1, [0006]) Petersen also discloses that "the invention features a non-naturally occurring method of targeting a pluripotent stem cell to a target tissue of a mammalian subject from another site in the mammalian subject." (Page 1, [0007])

The Specification of the subject application discloses that:

> intramyocardial administration of SDF-1 causes improvement in cardiac function after acute ischemia through two separate mechanisms, a direct mechanism which involves induction of cardiomyocyte cycling and regeneration and an indirect mechanism operating through enhanced chemotaxis of mobilized bone marrow-derived endothelial progenitors and cardiac neovascularization. (Page 78, lines 21-27)

Applicant respectfully submits that Peterson only discloses the indirect mechanism discussed in the Specification. Thus, Petersen does not disclose a method "to induce regeneration of endogenous cardiomyocytes", as recited in pending claim 35.

Hung et al. do not cure the deficiencies of Peterson. Hung et al. disclose two different animal models of coronary insufficiency: a "hibernating myocardium model" and an "ameroid model".

Hung et al. state that "[h]ibernating tissue is non-contracting muscle tissue, but is capable of contracting, should it be adequately resupplied with blood". (Page 6, [0038]) Hung et al. classify heart muscle as "healthy, normal or dead". (Page 6, [0038]) Hung et al. then distinguish "dead or diseased heart tissue" from "hibernating tissue". (Page 6, [0038]) Applicant's claimed invention is directed to a "disorder of a heart tissue involving loss or apoptosis of cardiomyocytes". Since lost or apoptotic cardiomyocytes cannot contract, applicant's claimed

invention differs from the hibernating myocardium model disclosed in Hung et al. As such, the hibernating myocardioum model disclosed in Hung et al. does not correspond to applicant's claimed invention of treating "a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes".

Applicant noted above that contrary to the Examiner's assertion in the January 18, 2011 Final Office Action the pending claims do not recite treating "a disorder of a heart tissue". Claim 35 expressly recites "a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes". Applicant respectfully submits that there are disorders of heart tissue which do not involve loss or apoptosis of cardiomyocytes. Such disorders are represented by the hibernating myocardium model disclosed in Hung et al.

In contrast, the ameroid model disclosed in Hung et al. is a model characterized by loss or apoptosis of cardiomyocytes. ("[The] 100% occlusion that is provided by the ameroid model makes the ameroid model more analogous to a myocardial infarction", Page 6, [0039]).

Hung et al. demonstrate that administration of FGF polypeptide to the ameroid model provided no benefit over placebo. (See Figures 7-9 of Hung et al., wherein data labeled as "IC" represents results obtained from intracoronary administration of FGF polypeptide to the ameroid model) Data labeled as "low", "mid", and "high" in Figures 7-9 of Hung et al. represents results obtained from administration of FGF polypeptide to the hibernating myocardium model, which is not representative of a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes.

Since Hung et al. show that intramyocardially or intracoronarilly administration of FGF polypeptide is not effective for treating a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes, a person of ordinary skill in the art would have no motivation to treat "a subject suffering from a disorder of a heart tissue involving loss or apoptosis of cardiomyocytes which comprises intramyocardially or intracoronarily administering to the subject an amount of an agent comprising a human stromal derived factor-1".

Accordingly, applicant respectfully submits that the combination of Petersen and Hung et al. does not render obvious the pending claims. Applicant requests that the Examiner reconsider and withdraw this rejection.

Claim 47

In the January 18, 2011 Final Office Action, the Examiner rejected claim 47 under 35 U.S.C. 103(a) as being unpatentable over Petersen and Hung et al. as applied to claims 35, 37, 43, 46 and 57, and further in view of Rempel et al. (Clin. Can. Res., 6: 102-111, 2000).

The Examiner asserted that "Rempel et al. teaches that the SDF-1 gene encodes two isoforms, SDF-1α and SDF-1β, that arise from alternative splicing (page 102, column 2, last paragraph)." The Examiner also asserted that "it would have been obvious to the person of ordinary skill in the art at the time the invention was made to modify the method of intramyocardially or intracoronarily administering SDF-1α to heart tissue as taught by Petersen and Hung et al. by substituting SDF-1α with SDF-1β as taught by Rempel et al."

Applicant's Response

In response, applicant respectfully traverses the Examiner's rejection. Applicant has shown above that independent claim 35, from which claim 47 depends, is not obvious over the combination of Petersen and Hung et al. Rempel et al. do not cure the deficiencies of Petersen and Hung et al. Therefore, even if one used the disclosure of Rempel et al. to provide SDF-1β, it would not have been obvious to one skilled in the art at the time the invention was made to use SDF-1β as recited in claim 47. Accordingly, applicant respectfully requests that the Examiner reconsider and withdraw this ground of rejection to claim 47.

Claims 49-51

In the January 18, 2011 Final Office Action, the Examiner rejected claims 49-51 under 35 U.S.C. 103(a) as being unpatentable over Petersen and Hung et al. as applied to claims 35, 37, 43, 46 and 57, and further in view of Isner et al. (PCT International Publication No. WO 99/45775).

The Examiner asserted that "Isner et al. teaches a method for increasing vascularization comprising administering to a mammal an effective amount of a vascularization modulating agent, such as stromal derived factor-1 (SDF-1) (bottom of page 4 through the top of page 5)." The Examiner also asserted that "Isner et al. disclose that the methods of the invention have a wide spectrum of uses in human patients, i.e. use in the prevention or treatment of at least cerebrovascular ischemia, ischemic cardiopathy, and myocardial ischemia (page 15, lines 1-5)." The Examiner further asserted that "it would have been obvious to the person of ordinary skill in the art at the time the invention was made to modify the method of intramyocardially or intracoronarily administering SDF-1α to heart tissue as taught by Petersen and Hung et al. to treat disorders of heart tissue as taught by Isner et al."

Applicant's Response

In response, applicant respectfully traverses the Examiner's rejection. Applicant has shown above that independent claim 35, from which claims 49-51 depend, is not obvious over the combination of Petersen and Hung et al. Isner et al. do not cure the deficiencies of Petersen and Hung et al. Thus, even if one used the disclosure of Isner et al. to treat disorders of heart tissue, the method recited in claims 49-51 would not have been obvious to one skilled in the art at the time the invention was made. Accordingly, applicant respectfully requests that the Examiner reconsider and withdraw this ground of rejection.